

WHAT IS CLAIMED IS:

1. A method for transmitting data from an optical network unit (ONU) to an optical line termination (OLT) in a Gigabit Ethernet passive optical network (GE-PON) using a time division multiple access (TDMA) scheme, comprising the steps of:

- 5 a) measuring a data transmission time when transmitting said data to said OLT;
- b) comparing the measured data transmission time with a predetermined normal transmission time; and,
- c) maintaining the transmission of said data if said measured data transmission time is less than or equal to said normal transmission time, and stopping the transmission of said
- 10 data if said measured data transmission time is greater than said normal transmission time.

2. An apparatus for transmitting data from an ONU to an OLT in a GE-PON using a TDMA scheme, said apparatus comprising a transmission control function block including:

- a switch for outputting said data to be transmitted to said OLT to a transmission line coupled to said OLT in response to an external control; and,
- 15 a transmission controller for measuring a data transmission time elapsing from the moment when the transmission of said data has been started, and controlling said switch to maintain the output of said data if the measured data transmission time is less than or equal to a predetermined normal transmission time and to stop the output of said data if said measured data transmission time is greater than said normal transmission time.

3. The apparatus as set forth in claim 2, wherein said transmission control function block is located in any one of a physical coding sub-layer (PCS), physical medium attachment (PMA) sub-layer, and physical medium dependent (PMD) sub-layer of a physical layer of said ONU.

5 4. An apparatus for transmitting data from an ONU to an OLT in a GE-PON using a TDMA scheme, comprising a transmission control function block for measuring a data transmission time elapsing from the moment when the transmission of said data has been started, for maintaining the transmission of said data if the measured data transmission time is less than or equal to a predetermined normal transmission time, and for stopping the
10 transmission of said data if said measured data transmission time is greater than said normal transmission time.

5. A method for transmitting data from an ONU/OLT to an OLT/ONU in a GE-PON using a TDMA scheme, comprising the steps of:

15 a) stopping the transmission of said data due to the occurrence of an error in an upper layer; and

 b) turning off a laser of a PMD sub-layer of a physical layer irrespective of a laser control signal from a multipoint media access control (MAC) control layer if the transmission of said data is stopped, said multipoint MAC control layer being an upper layer of a PMA sub-layer of said physical layer.

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6. The method as set forth in claim 5, wherein said step a) includes the steps of:

a-1) measuring a data transmission time when transmitting said data;

a-2) comparing the measured data transmission time with a predetermined normal transmission time; and

5 a-3) maintaining the transmission of said data if said measured data transmission time is less than or equal to said normal transmission time and stopping the transmission of said data if said measured data transmission time is greater than said normal transmission time.

7. An apparatus for transmitting data from an ONU/OLT to an OLT/ONU in a GE-
10 PON using a TDMA scheme, comprising:

a transmission control function block including a switch for outputting said data to be transmitted to a lower layer, and a transmission controller for measuring a data transmission time elapsing from the moment when the transmission of said data has been started, and controlling said switch to maintain the output of said data if the measured data
15 transmission time is less than or equal to a predetermined normal transmission time and to stop the output of said data if said measured data transmission time is greater than said normal transmission time; and

a laser controller located in a PMD sub-layer of a physical layer, said laser controller controlling a laser in response to a switch control signal from said transmission
20 control function block and a laser control signal from a multipoint MAC control layer.

8. The apparatus as set forth in claim 7, wherein said laser controller is adapted to control said laser in response to said laser control signal from said multipoint MAC control layer upon determining, on the basis of said switch control signal from said transmission control function block, that an upper layer is normally operated.

5 9. The apparatus as set forth in claim 7, wherein said laser controller is adapted to keep said laser off irrespective of said laser control signal from said multipoint MAC control layer upon determining, on the basis of said switch control signal from said transmission control function block, that an upper layer is abnormally operated.

10 10. The apparatus as set forth in claim 7, wherein said transmission controller is a jabber controller.